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STAFF AS OF DECEMBER 31, 1983

ADMINISTRATION

G.D. Grainger ..... Director
P. Fowler
M. Dannish

SHELTERBELT PRODUCTION & INVESTIGATIONS

H.T. Oosterhuis ..... Shelterbelt Specialist

Shelterbelt Production, Distribution & Special Planting

B. Breneman

Shelterbelt Production

R. Bok
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Grounds Maintenance, Arboretum and Fruit Orchard

A.R. Baxter
S. Cardinal
H. Brown

Container and Provincial Parks

C. McIsaac
T. Pheh
J. Sumka

Seed Investigation, Collection and Fruit Orchards

A. Straka
Doreen Stefner
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Field Inventory

F. Straka
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HORTICULTURE LIAISON

B. Vladicka ..... Horticulture Extension Specialist
L. Taylor ..... Sod & Home Garden Specialist

VEGETABLE EXTENSION

R. Trimmer ..... Vegetable Extension Specialist
(retired January 31, 1984)

FARM OPERATIONS

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Chemical and Seeding Maintenance

W. Barker
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Farm Operations and Maintenance

D. Wearmouth
C. Cooreman
V. Noel
S. Berube
B. Chedzoy

Machine Maintenance

N. Bidulock
G. Dames
B. Petherbridge

Irrigation

D. Milne

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HORTICULTURE EXTENSION

Horticulture extension is responsible for a provincial program that provides information to amateur horticulturists. Because of the diversity in the needs of gardeners, the programs are delivered in many ways.

Horticulture extension continued to conduct its winter education program through the offices of the District Agriculturists and Home Economists. The planning and co-ordination of the program that offers three courses per region was handled by the Extension Horticulturist. Staff at the Alberta Tree Nursery & Horticulture Centre and the Alberta Horticulture Research Center assisted in conducting the courses that covered the topics of greenhouse construction and management, landscaping, general gardening, fruit and vegetables, and indoor gardening. In addition to the eighteen regional courses, three other courses were conducted by this office throughout the province.

This office also received numerous requests for shorter presentations that deal with any aspect of horticulture. In 1983, fourteen presentations were made to amateur and professional groups.

Horticulture information was also disseminated by telephone, radio, television, displays, publications and other audiovisual means. The two horticulturists, with the addition of a seasonal employee, handled over 4700 telephone inquiries and 50 plant samples. Horticulture extension also continued to operate a service providing a taped telephone message that was changed semi-weekly. A seasonal employee based in Stettler was also employed to provide horticulture information services to that region of the province. During the months of June, July and August, this individual handled 153 inquiries, made 105 farm visits and wrote 13 columns for the local newspaper.

Publications produced during 1983 included the quarterly newsletter Nursery Notes, "Outdoor Plants Harmful or Poisonous to Humans" (Agdex 666-2 Revised), Laying Sod (Agdes 273/22-1) and several articles for trade magazines and daily newspapers.

Displays were produced for the Landscape Alberta Nursery Trades Association Annual Convention, open house at the City of Edmonton Muttart Conservatory, Alberta Horticultural Association Provincial Show, Garden of Eden at the Calgary Stampede and Field Day at Alberta Horticulture Research Center.

As of September, horticulture extension staff were responsible for the recommendations made on all home garden soil tests and those of turfed areas that were tested by Alberta Soil and Feed Testing Lab. Two hundred and sixty-seven reports were completed in 1983.

Horticulture Extension served as a liaison between Alberta Agriculture and agencies involved with the development of amateur horticulture such as the Alberta Horticultural Association (A.H.A.) and its affiliated societies, the University of Alberta Devonian Botanic Garden, urban municipalities and the universities and colleges.

The extension horticulturist is a member of the executive and several committees of the A.H.A., and co-ordinator of their Education Program.

Assistance was provided in the planning of the Association's major functions including the Annual Meeting held in Red Deer and the Provincial Show in Edmonton. The extension horticulturist continued to serve as the editor of the A.H.A. quarterly bulletin Alberta Horticulturist and their newsletter Hort Happenings and edited the 1982 Annual Report of the A.H.A. The meetings and shows of several of the affiliated societies were attended through the year.

This office continued to administer three grant programs. One is provided to the A.H.A. and another to The University of Alberta Devonian Botanic Gardens to offset operating expenses. Grants were also provided to urban municipalities in Alberta to assist them in providing horticulture information to homeowners and gardeners.

Horticulture extension staff sit on several government advisory committees: The Extension Advisory Committee, the Environmental Horticulture Advisory Committee, and the Alberta Horticultural Advisory Committee.

Horticulture extension worked closely with other areas of the department in the development of horticulture in the province.

TURF EXTENSION AND RESEARCH

Turf extension activities included inquiries from present and potential sod growers and turf managers. A pamphlet on laying sod was written for homeowners as well as articles for the A.T.N. & H.C. newsletter (Nursery Notes) and the Prairie Landscape Magazine. The sod specialist attended the Canadian Golf Course Superintendents' Turfgrass Conference, sod commodity group meetings, and the L.A.N.T.A. annual convention. Two turf maintenance courses were taught and turf research and resource information was presented at a workshop session at the L.A.N.T.A. convention. Several sod farms were visited.

Turf research included data collected from the trials established in 1982 plust the establishment of four new trials. This report summarizes the 1983 results of the turf trials. Complete reports of each trial are available from the A.T.N. & H.C. Sod growers wishing to set up fertility or cultivar trials on their farms may request plot plans from the A.T.N. & H.C.

TRIALS ESTABLISHED IN 1982

Perennial Ryegrass Cultivar Trial

Perennial Ryegrass are generally not fully hardy in Alberta. Derby had only 5-15% winter survival, Omega & Yorktown were similar with 27% and 35% survival, and Norlea had 58% survival. All of the cultivars filled in throughout the season. Omega, and Yorktown had acceptable stands by autumn. Norlea began to fill in well but was the patchiest cultivar by July and had the poorest colour at the end of the season.

Kentucky Bluegrass Cultivar Trial

Of the fifteen cultivars tested, Touchdown, Banff, and Majestic were some of the first grasses to begin growth in spring. Nugget did not begin to green-up until mid-May. In mid-summer the darkest green grasses were America, Baron, Majestic, and Ram I. Banff, Dormie, and Birka lost their colour first in autumn while some cultivars were green when the snow fell. There was no significant difference in colour uniformity and little difference in density: all of the grasses performed well. Cheri is one of the coarsest bladed cultivars and Ram I has one of the finest blades. Weed competition was greatly improved from last year.

Low Maintenance Grasses

The 36 low maintenance grasses were mown regularly and fertilized twice in the growing season but were not irrigated. Fairway and Nordan Crested Wheatgrass, Big Bluegrass, and Foa pallustris had the earliest growth. The Streambank Wheatgrasses, Red Top, the Puccinellias, the Intermediate Ryegrass had the poorest spring green.

Tall Fescue, Rocky Mt. Fescue, and Intermediate Ryegrass had excellent colour all through the growing season and into late autumn. The grasses with the poorest colour during the dry weather were the Puccinellias, Streambank Wheatgrass, and five bluegrasses - Rubens Canada, Glaucas, Draylar Upland,

and Alpine. All of the fescues had better than average colour during the dry weather, as did the lawn mix and Birka Kentucky Bluegrass.

Covar Sheep Fescue, Alpine Bluegrass, and Birka KBG were three of the densest grasses. The least dense grasses were the Streambank Wheatgrass, Meadow Bromegrass, Sherman Big Bluegrass, and the Meadow Foxtails. The Streambank Wheatgrasses and Sherman Big Bluegrass were among the weediest plots.

All of the fescues had better than average autumn colour. Rubens and Alpine Bluegrasses, the Puccinellias, and Red Top were some of the first grasses to turn brown in autumn.

Lawn Winterizer Fertilizer Trial

Three "winterizer" fertilizers were applied to plots on October 27, 1982. The 13-16-10 plots were the first to green up in April and remained the greenest until August when differences among the plots disappeared. The 12-3-5 plots were slightly less green than the 13-16-10 trial throughout the season. The 4-8-16 trial was slow to green up and was only slightly greener than the unfertilized plots for the whole season. There was no snow mould on any of the plots (there was little snow mould damage in Edmonton in spring 1983).

TRIALS ESTABLISHED IN 1983

Arboretum Lawn Demonstration Plots - Nineteen lawn plots comparing seed mixes, fertilizer types, and mowing practices were seeded on June 8-10. Of the four local seed mixes used, the "Playground" mix (with 30% crested wheatgrass and 15% perennial ryegrass) germinated most quickly and was lush, green and almost weed-free all season.

The 75% Kentucky Bluegrass and 25% Creeping Red Fescue (standard mix) plots germinated slowly (about three weeks). By the end of the season the plots had a good grass cover but were very weedy.

The 100-90% Kentucky Bluegrass plots had slower and less uniform germination than the standard mix. Grass cover was good by the end of the season but the weeds were worse than the standard plots.

Plant Growth Regulators

Embark and Mon 4621 (an experimental product from Monsanto) were sprayed on a 20 year old Kentucky Bluegrass/Crested Wheatgrass lawn on June 2 and reapplied on August 16.

Overall, there was little difference in plant height between the growth regulators and the untreated control. The growth regulators had very little effect on turf colour and did not reduce seedhead formation.

No recommendations can be made from this trial because the plots were mowed by accident in July. After the August application there was little rainfall and there was almost no turf growth in any of the treatments.

Fairy Ring Control Trial

Control of fairy rings (dark green or brown circles and semi-circles) in lawns is a common and serious problem to homeowners and turf managers. Four control methods were used on fairy rings in the infield at the Northlands racetrack in Edmonton.

Two sets of plots were fumigated with formaldehyde and metam in late August. This involved stripping the sod, cultivating the soil, applying the fungicides with a watering can, sealing the plot with a tarp, airing out the plot 10 days later, and finally re-grassing the area (approximately 90 minutes/ring).

The second set of treatments were aerated and watered followed by the application of oxycarboxin and benodanil with a watering can (approximately 25 minutes/ring).

Results will be recorded in spring 1984.

Sod Heating

Two preservatives were tested for their ability to control heating in pallets of sod. Two concentrations of propionic and acetic acid were sprayed on the sod just before harvesting on August 23. Each day the temperatures at the centre of the pallets were recorded. After the seven days the sod was laid to determine the effect of the perservatives on installed sod.

During the first three days after harvest the propionic acid treatments were significantly cooler than the control. While the acetic acid treatments were significantly hotter. By the fifth day the acid treated sod was becoming hotter than the control and on the seventh day the chemical treatments were similar and significantly hotter than the control.

Even though temperatures were as high as 50°c in the pallets and the sod was stacked for much longer than usual, by the end of September most of the sod had recovered and was growing well.

VEGETABLE PROGRAM

The vegetable program at the Alberta Tree Nursery and Horticulture Centre consisted of extension activities and demonstrational research experimental plots.

Extension

A major activity was providing advice and information concerning commercial production and marketing of horticulture crops, in reply to inquiries from individuals seeking assistance. Contacts were made by office visits, correspondence, phone and farm visits including inspections under the Market Garden Development Grant Program. There were 48 applications received relative to this program of which 21 were approved and 27 rejected. The main reason for rejection was because of size being below the one hectare (2.5 acres) minimum requirement.

A number of producer oriented education and development programs were organized, conducted, and assisted with and included the following:

- Participation in market garden short course courses at Edmonton, Calgary, and Bonnyville.
- Organized and assisted with a number of regular meetings of the Edmonton Vegetable Growers and the Alberta Greenhouse Growers Association.
- Acted as secretary of the Alberta Vegetable Advisory Committee.
- Served as a member of Alberta Farmers' Market Advisory Committee.
- Assisted with an On-Farm Demonstration, under the Farming for the Future Program, in the Fort McMurray area. The project consisted of the evaluation of polyethylene mulch, tunnels and trickle irrigation treatments.
- Participated in radio and T.V. programs relative to market gardening.
- Organized the establishment of demonstrations on two producer fields using new mechanical polyethylene tunnel laying equipment from the Alberta Horticulture Research Center.

Research

The purpose of the Market Garden Research Program at the Alberta Tree Nursery and Horticulture Centre was to evaluate various cultivars and cultural techniques. Experimental plots were established to determine better production methods, particularly improving earliness, yield and potential of crops important to the growers of the central and northern areas of the province.

The land at the A.T.N. &. H.C. site is a medium textured black soil. The frost free period (-2°C) averages 124 days.

In 1983 the spring was unusually dry requiring irrigation for germination and early growth. The dry period was followed by excessive rainfall, while the latter part of the growing season again experienced dry conditions.

The following are summaries of various trials that were conducted. Detailed reports of results are available from the Alberta Tree Nursery and Horticulture Centre, R.R. #6, Edmonton, Alberta, T5B 4K3.

Cultural Trials

1) Evaluation of Polyethylene Mulch and Tunnels on Vine Crops:

Six treatments were established in each of these trials. Using a commercial mulch layer, 1.5 mil black and clean polyethylene plastic were each applied to two rows of each trial as a ground mulch. The other two rows were left bare. All rows were then seeded. After planting one row of each type of mulch and bare soil treatment were covered with a perforated clear polyethylene tunnel. This resulted in one each of clear plastic, black plastic and bare soil with tunnels and another row each with no tunnels. Results of the individual trials were as follows:

a) Pickling Cucumbers - Transplants vs. Direct Seeding

The cultivar used was "Earlipik". Clear mulch with tunnel yielded the highest in both the transplant and direct seeding treatments. The best yield in the trial was clear mulch with tunnel as direct seeded. In all treatments the direct seeding yielded better than the transplants except clear mulch without tunnel. The transplants were earlier as would be expected.

b) Pumpkin

"Spirit" was the cultivar used. All treatments with tunnels yielded better than the no-tunnel treatments. Bare soil with tunnel had slightly the highest yield in the trial.

c) Winter Squash

The cultivar used was "Baby Hubbard". Contrary to expectations several no-tunnel treatments had the higher yields, namely bare soil and clear mulch.

d) Summer Squash

For this trial the cultivar "Zucchini Select" was used. All tunnel treatments yielded higher than the no-tunnel treatments. The best yields in the trial were from black and clear mulch with tunnel treatments. The tunnel treatments were also earlier.

2. Green Pepper Polyethylene Mulch, Tunnel and Hotcap Trial:

Using the cultivar "Early California Wonder". The same mulch treatments were used as with the vine crops. In this case tunnels were compared to hotcaps. Black mulch with tunnel had the highest yield, followed by clear mulch with tunnel, but were later maturing than all the others. Under hotcaps clear mulch had the best yield.

3. Broccoli Population Trial:

The cultivar "Premium Crop" was direct seeded in a replicated trial to evaluate different in-row plant spacings. Spacings of 30 cm, 23 cm, 15 cm, and 10 cm were compared. The 15 cm and 10 cm spacing had the highest yields

and were significantly hgiher by data analysis than the 30 cm treatment which had the lowest yield.

4. Pumpkin Transplant vs. Direct Seeding Trial:

Using the cultivars "Spirit" and "Small Sugar" transplants were compared to direct seeding. "Spirit" yielded better when direct seeded while "Small Sugar" had a higher yield as transplants.

5. Chinese Cabbage Seeding Date Trial:

Three cultivars (Summertime, Springtime, and Wintertime) were each seeded on three different dates (May 4, June 27, and July 11) to study the effect of planting date on the premature bolting habit of this crop, as it relates to yield, maturity, etc.

All cultivars of the May 4 planting bolted excessively resulting in no marketable heads. Wintertime was the most prone to bolting. Very little bolting occurred in the other plants, of any cultivar, however, little harvesting was done due to excessive head rotting.

Cultivar Trials

1. Pickling Cucumber Cultivar Trial:

Cultivars evaluated were Earlipik, Target, Calypso, County Fair, Lucky Strike, and Tempo. Earlipik had significantly the best yield by data analysis. There were no significant differences in earliness.

2. Slicing Cucumbers Cultivar Trial:

Cultivars evaluated included Slicemaster, Sprint 440, Revenue, A&C Improved, and Hy Slice. Revenue had the highest yield, followed closedly by Slicemaster and Sprint 440. However, there were no significant yield or earliness differences by data analysis.

3. Cauliflower Cultivar Trial:

The cultivars Dominant, White Empress, Snow Crown, Snowmound, Taipan, and Chinook were evaluated in a direct seeded vs. transplant trial. Snow Crown yielded the best in the direct seeded treatment while Taipan was the highest as transplants, Chinook bolted prematurely in both treatments, resulting in no marketable heads. Many heads of transplanted Snow Crown and White Empress were unmarketable due to head color and development.

4. Sweet Corn Cultivar Trial:

Cultivars evaluated were Buttervee, Spring Gold, Northern Super Sweet, Northlite, Early Sunray, Earlivee, Northern Vee, Seneca Star, Seneca Horizon, Early Bird, and Sprite. Northlite had the best yield based on the number of ears produced, followed by Sprite, Seneca Star and Early Bird. Northern Vee had the earliest maturity followed by Earlivee.

5. Storage Cabbage Cultivar Trial:

Cultivars tested were Safekeeper, Ultra Green, Quick Green Storage, and

Storage Green. Safekeeper had significantly the highest yield and head weight. Samples from all cultivars were placee in storage to determine keeping quality.

6. Pea Cultivar Trial:

The following eight cultivars of peas were evaluated. Bell Roy, Granada, Parlay, Puget, Rally, Spring, Tempter and Trifect. Tempter yielded the best, followed closely by Puget and Trifect. Spring was a few days earlier maturing than the others.

7. Tomato Cultivar Trial:

Cultivars tested were Earlirouge, Cold Set, Hybrid 31, The Juice, and Hardicross. Hardicross had the highest yield, followed closely by Hybrid 31. Hybrid 31 produced the highest percentage of ripe fruit during harvest. Hardicross had slightly better quality generally.

SHELTERBELT PROGRAM

GROWING CONDITIONS AT THE NURSERY DURING THE 1983 PRODUCTION YEAR

At the Alberta Tree Nursery we received an early snowfall in November which was beneficial for container stock outdoors. The total snowfall during the winter (November-April) was a low 58 cm. The record minimum daily temperatures dropped below -28°C only once. The average minimum daytime temperature during January, normally the coldest month, was -15°C. The ten year average for January is -20°C. Because of the mild conditions, the snowcover disappeared the beginning March, therefore run-off of meltwater was almost absent.

The warm winter resulted in excellent survival of our planting stock which overwintered outside in containers. However container stock had to be watered at the end of March to avoid dessication. We were also able to move into the fields by April 10th to start lifting the coniferous transplants (sometimes we cannot do this before the begining of May).

From April 15th till June 14th we received only 20 mm of moisture (0.8 inch) which when combined with the early disappearance of the snow made the soil extremely dry. Consequently germination of fall seeded crops was poor and late. However, weed growth was also slow and sparce. All that changed when between June 17 and July 17 we received 250 mm (10 inches) of rain. Field work such as weeding came to a halt. The moisture was beneficial for the two million cuttings of poplar and willow, that had been planted just before the rains came. These cuttings root best under moist conditions.

The first killing frost occurred on September 19th (-3°C). This resulted in a front free period of 118 days. Between September 15th and November 15th only 25 mm of rain was received, which made fall work easy. The heavy summer rains had provided for a good moisture reserve in the subsoil.

By the middle of December the accumulated snowfall amounted to 20 cm which was provided for a good protective blanket on the outside stored container stock.

Tree Distribution

Assembling the tree orders started April 25th. Table I summarizes the distribution by districts, volume of trees and progress of the activity. Table II summarizes the distribution by species, as well as the supply and demand situation for 1983. There were 389,239 plants unavailable and this volume is now given priority in the 1984 distribution year.

SHIPPING OF SHELTERBELT STOCK - 1983

Table I

D.A. DISTRICT	# ORDERS	# TREES	# OF PARCELS	SHIPPING DATE
Taber	141	52743	557	April 27
Medicine Hat	173	75070	1006	April 27
Warner	76	23590	437	May 2
Lethbridge	184	69578	968	May 2
Foremost	118	47804	580	May 2
Brooks	233	48597	986	May 3
Claresholm	129	79160	755	May 3
Vulcan	102	40049	408	May 5
Pincher Creek	66	30827	244	May 5
Cardston	191	73639	984	May 5
Lyen	56	38411	336	May 5
Hanna	70	98591	1019	May 5
Strathmore	161	73707	970	May 5
Drumheller	57	37556	560	May 6
Three Hills	85	17263	332	May 6
Stettler	100	39999	611	May 6
Olds	144	34883	653	May 7
Sedgewick	135	30453	637	May 7
Coronation	84	59860	730	May 9
High River	117	37861	724	May 9
Bonoka	75	18097	360	May 10
Nimbey	100	39999	430	May 10
Red Deer	179	43480	934	May 10
Lacombe	100	21232	412	May 10
Calgary	202	70669	1097	May 11
Wetaskiwin	162	42057	997	May 11
Rocky Mountain House	110	18735	360	May 11
Camrose	119	36584	765	May 11
Lloydminster	86	25046	520	May 12
Vermilion	111	24683	549	May 12
Provost	80	18692	395	May 12
Legreville	168	42349	725	May 12
Wainwright	102	35693	714	May 13
Bonnyville	144	35926	717	May 13
St. Paul	206	33835	724	May 16
Smoky Lake	77	18017	443	May 16
Wyley	114	27879	597	May 16
Grande Prairie	252	69373	1360	May 16
Edmont	152	31140	889	May 17
Lac La Biche	68	12337	233	May 17
Leduc	72	14626	350	May 17
Morinville	128	22024	445	May 17
Stony Plain	227	52744	992	May 18
Drayton Valley	25	3062	57	May 18
Edmonton	66	11151	300	May 18

D.A. DISTRICT	# ORDERS	# TREES	# OF PARCELS	SHIPPING DATE
Westlock	114	17540	420	May 18
Edson	40	5546	103	May 18
Evansburg	58	9602	181	May 18
Sangudo	133	24904	453	May 19
Edmonton	83	18600	371	May 19
Barrhead	84	14686	322	May 19
Athabasca	84	18490	396	May 19
Fahler	107	34977	583	May 19
Peace River	132	31313	495	May 19
Eaglesham	50	7578	107	May 20
Valleyview	74	15465	261	May 20
Spirit River	132	18785	375	May 20
High Prairie	57	12127	223	May 20
Manning	62	9045	151	May 24
Ft. Vermilion	77	27748	412	May 24
Fairview	88	14877	307	May 24
TOTALS	7038	2073300		20 Days

Table II

SPECIES	# PLANTS DISTRIBUTED	# PLANTS REQUESTED	# PLANTS SUBSTITUTED	# PLANTS ON BACKORDER
Northwest Poplar	21000	87255	0	61280
Brooks #6 Poplar	161000	156025	4975	0
Griffin Poplar	3500	7650	0	4150
Plains Cottonwood Poplar	4400	4810	0	410
Laurel Leaf Willow	65000	79850	0	0
Acute Leaf Willow	68550	53700	14850	0
Golden Willow	20425	20425	0	0
Peach Leaf Willow	0	2575	0	2575
Manitoba Maple	114000	134150	0	20150
Green Ash	62500	62500	0	0
Bur Oak	30875	30875	0	0
White Birch	27750	33475	0	5725
Mayday	17800	21425	0	3625
Chokecherry	44625	47335	0	2710
Russian Olive	0	12160	0	11560
Sea Buckthorn	12400	11800	600	0
Hawthorn	700	12825	0	12125
Caragana	768275	768275	0	0
Villosa Lilac	76000	163850	0	87850
Common Lilac	19000	116110	0	97050
Honeysuckle	63000	104475	0	40875
Dogwood	34500	34500	0	0
Wedge Rose	27000	33375	0	5900
Altaica Rose	2800	2325	425	0
Silver Buffaloberry	4000	8200	0	4200
Cherry Prinsepia	12500	13450	0	950
White Spruce	160000	160000	0	0
Colorado Spruce	160000	178850	0	18850
Norway Spruce	8000	10070	0	2070
Lodgepole Pine	50000	50000	0	0
Scots Pine	15000	21840	0	6840
Siberian Larch	17200	17200	0	0
Conservation Bundle	1500	1844	0	344
TOTALS FOR 1983	2073300	2463199	20900	389239

ARBOR DAY TREES

Table III

In total 43,371 Arbor Day Trees were distributed to the following destinations:

SEEDLINGS	DESTINATION
15	Edmonton
2000	Rocky Mountain House
200	Calgary
500	Camrose
100	Lethbridge
550	Hinton
600	Leduc
100	Lethbridge
1500	Medicine Hat
250	St. Albert
450	St. Albert
900	Stony Plain
40	Edmonton
400	Medicine Hat School District
200	Caroline
100	Edmonton
36	Edmonton
15000	City of Edmonton
1500	Sherwood Park
500	Stony Plain
300	Fort Saskatchewan
140	Wetaskiwin
30	Sedgewick
50	Millet
75	Beaverlodge
50	Viking
550	High Prairie
50	Sexsmith
200	Hanna
250	Pincher Creek
16000	Calgary
50	Leduc
100	Edmonton
500	Smoky Lake
20000	Calgary
1400	Lacombe
125	St. Albert

At harvest success was rated at 28% Poplars usable for shipping and 35% Willows usable for shipping. Tip cuttings which are not used in Alberta Tree Nursery and Horticulture Centre production were offered to nurserymen and environmental organizations: 42,000 were distributed.

b) Weeding

The early dry spring showed promise for good chemical weed control. However, the lengthy wet summer which kept crews from the fields for three weeks reversed this situation. A heavy and diverse weed population was a problem in the seedbeds, transplants and cuttings.

c) Grounds and Arboretum

The grounds crew planted some 5000 annuals received from the Alberta Hospital Greenhouses. The planting and maintenance of the Regional Overwintering Trial involving 1575 trees and shrubs was also added to grounds' crew responsibility.

Early fall saw the beginning of tree and shrub planting in the new arboretum, three each of 16 species have been planted.

d) Transplanting of Conifers

The transplanting of container grown conifers took place from August 16 to September 13 (18 days). 594,400 conifers were transplanted at the rate of 33,000 per day.

e) Seeding

Seeding was done in the late spring, summer, and fall of 1983. The following amounts were seeded at the approximate rate of 500 viable seeds per metre.

TYPE	NUMBER OF METRES, NOT INCLUDING CARAGANA
Tall Deciduous	3635.0
Small Deciduous	2432.5
Hedge Plants	10061.0
Conservation Bundle	1559.0
Coniferous	279.0
Miscellaneous	558.0

Caragana was seeded in a new field (30) west of existing nursery grounds. 7.0 hectares were seeded July 15th. A fall inventory showed 14 plants per metre (1.9 million caragana). A second seeding of two hectares took place on August 24th.

f) Fall Lifting and Grading

Plant material was lifted and graded from September 26th to December 8th, including 145,000 plants from the container section. The material to be used in 1984 shipping amounts to the following:

Tall Deciduous	789680	Conservation Bundle	1474
Small Deciduous	591975	Coniferous Plants	81870
Hedge Plants	991940	Miscellaneous	37800

g. 1983 Field Performance of Shelterbelt Stock

At the conclusion of shipping 25 of deciduous and 10 of coniferous species are planted, watered and weeded twice. The following is survival rate data of species shipped, broken down into source of material and storage method:

	% Survival	Number of Species
Container (cooler storage)	93.2	9
Bareroot (cooler storage)	76.5	5
Bareroot (heeled in F27)	79.0	26
Bareroot (spring harvest)	50.0	4
I.H. (spring)	84.0	6
PRN (spring)	35.9	1
A.H.R.C. (heeled in F27)	18	1
Overall	77.2	45

SMALL CONTAINER GROWING PROGRAM 1983

Production

a. Container Production for 1983 totalled 1,158,883 seedlings grown over two crop periods.

Deciduous material = 271,654 seedlings
Coniferous material = 887,229 seedlings

b. Container Production Breakdown for 1983:

	DECIDUOUS	CONIFEROUS	PRODUCTION %
Shelterbelt	103,488	595,824	60%
Provincial Parks	144,064	16,806	14%
Arbor Day	-	58,800	5%
Contract Growing	-	126,000	11%
Indian Affairs	-	87,600	8%
Special Orders & Trials	24,102	2,199	2%
TOTALS	271,654	887,229	

c. Container Used for Total Production:

37cc containers = 74% (the so-called "Ferdinand" container)
160cc containers = 26% (the so-called "Hillson" container)

Stock Shipped

A total of 146,218 seedlings were shipped in 1983 to the following clients:

	DECIDUOUS MATERIAL	CONIFEROUS MATERIAL
Indian Affairs		90,400
Land Reclamation	2,860	
PRSFG *	2,750	
Miscellaneous	450	5,897
Arbor Day	43,861	
	49,921	96,297

* (i.e. the Peace River Small Fruit Growers Association, involved in growing saskatoons commercially.)

Stock Overwintered

A total of 1,749,654 container seedlings were overwintered during 1982-83.

	DECIDUOUS	CONIFEROUS	TOTAL AMOUNT
Shelterbelt	102,975	1,350,952	1,453,927
Special Orders	17,593	19,900	37,493
Indian Affairs		140,800	140,800
Land Reclamation	5,484	377	5,861
Miscellaneous	476	97,894	98,370
Trials	3,969	9,234	13,203
TOTALS	13,497	1,619,157	1,749,654

A mortality of 5% was recorded in the spring of 1983, or 87,000 seedlings.

Labour Costs Only - Filling, Seeding, and Seed Costs

	CROP 2-83	CROP 1-84
Filled and Seeded cavities	64,320	634,992
Deciduous cavities	64,320	39,168
Coniferous cavities	-	595,824
Amount of Seed (kg)	4.5	9.987
Filling Cost	$762.40	$2477.81
Seeding Cost	$738.58	$3873.95
Seed Cost	$495.00	$1098.57

Filled cavities = $4.63 per 1000 cavities
Seeded cavities = $6.60 per 1000 cavities
Seed Cost $110/kg.
Labour costs based on the average hourly rate of $9.53/hour.
Cuttings = 40,128 cavities

Labour Requirements for Growing the Small Container Crop

The Container section for the 1983 growing season comprised of three permanent staff and twenty-four casual and seasonal staff. The following data outlines mandays used for major job functions.

Activities	Mandays Used	%
Charts, watering & fertilizing crops, inventory, chemical application	56	4
Filling and seeding containers	169	13
Thinning, and weeding greenhouse crops	257	20
Unloading and loading greenhouse crops	100	7
Weeding and dudding lathhouse crops	197	15

Activities	Mandays Used	%
Maintenance greenhouses, lathhouses and working complexes	208	16
Pickups	72	6
Trial Work	21	2
Miscellaneous	215	17
	1295	100

PROVINCIAL PARKS PROGRAM 1983

Shipping

A total of 23,218 native trees were shipped to the various Provincial Parks. The native trees were shipped in 1,2, and 5 gallon pots.

PARK	POTTED DECIDUOUS	POTTED CONIFEROUS
Parklake	720	
Little Bow	470	
Carseland	50	
Cypress Hills	150	
Ross Lake	2,640	400
Jarvis Bay		306
Dilleberry	1,550	212
Big Knife	2,300	350
Strathcona		195
Goose Lake	300	100
Moonshine	3,700	500
Assineau		100
Hilliard's Bay	1,010	300
Carson Lake	4,100	738
Chain Lakes	32	10
Kinbrook	2,335	200
O'Brien	200	50
Tillebrook	200	
	19,757	3,461

Deciduous Species

Dogwood, White Birch, Willows - Laurel Leaf, Mix, Native and Sandbar, Wolf Willow, Silver Buffaloberry, Cinquefoil, Prickly Rose, Poplars - Mixed, Balsam, Aspen, Plains, Black Cottonwood, Narrowleaf.

Coniferous Species

White Spruce, Pines - Lodgepole, Scots, Jack, Creeping Juniper.

MAINTENANCE ACTIVITIES OF THE PROVINCIAL PARKS PROGRAM

Weeding, Pruning, and Chemical Application

Potted native species were hand weeded. Minor concerns of Birch Leaf Minor, Forest Tent Caterpillars, and mildew were kept under control with Cygon 4E, Malathion, and Benlate. Pruning of tall Poplars to maintain proper shape and growth characteristics involving 12,000 trees was carried out.

Pot Spacing

This year potted native species in 2 and 5 gallon pots were spaced to allow room for growth enhancement.

Seeding

In 1983 160,870 cavities were propagated under greenhouse scheduling in 37 cc and 160 cc containers, and mist beds. Deciduous cuttings were propagated in 160 cc containers, and coniferous cuttings in mist beds.

Deciduous species seeded =	105,952
cuttings =	38,112
	144,064

Coniferous species seeded =	7,800
cuttings =	9,006
	16,806

Transplanting and Repotting

In 1983 a total of 71,176 native species were transplanted in 1,2, and 5 gallon pots.

Deciduous species potted up in 1 gallon	=	43,853
potted up in 2 gallon	=	1,506
repotted up in 2 gallon	=	7,845
		53,209

Coniferous species potted up in 1 gallon	=	6,523
potted up in 2 gallon	=	3,614
repotted up in 2 gallon	=	5,679
repotted up in 5 gallon	=	2,151
		17,967

LABOUR REQUIREMENTS FOR THE PROVINCIAL PARKS PROGRAM

The following number of mandays of seasonal labour was required to perform the growing activities:

	# Mandays	%
Shipping	65	8
Weeding, pruning, pest control	93	11
Spacing of containers	114	14
Seeding, transplanting, repotting	556	67
TOTAL	828	100

Overwintering and Mortality of Potted Native Species

A total of 127,850 pots of deciduous and coniferous species were overwintered 1982-83 with a mortality of 11%.

Stock on Hand Fall 1983

A total of 295,993 native plants on hand fall 1983, with 144,953 potted species and 151,040 seedlings in 37 cc and 160 cc containers.

	DECIDUOUS	CONIFEROUS
Pots (1,2, and 5 gallon)	118,329	26,624
Containers	147,508	3,532
	265,837	30,156

SHELTERBELT EXTENSION ACTIVITIES DURING 1983

1. P.E.P. program was active in the County of Camrose from January till May 1983. Woody vegetation management in County Parks was the principal activity of a two man work crew.

2. Shelterbelt extension and woody plant maintenance courses were held at six locations (Vegreville, Morinville, Wetaskiwin, Valleyview, Spirit River and High Prairie).

3. Technical assistance was provided for the making of a 20 minute film, documenting the "Shelterbelt Story" in Alberta.

NURSERY PRODUCTION FOR SHELTERBELT STOCK

Labour requirements

In addition to the permanent labour staff of seven employees, seasonal labour requirements totalled 4774 mandays. The first seasonal staff was hired on after the Easter weekend. All seasonal staff was terminated on December 2, 1983. A breakdown by activities for major seasonal labour requirements was as follows:

	# Mandays	%
Spring Shipping	674	14
Spring Lifting of Conifers	317	7
Planting of Cuttings	316	7
Hand Weeding Seedbeds	1075	22
Ground Maintenance	421	9
Transplanting Conifers	367	8
Fall Lifting and Grading	835	17
Seeding	61	1
Miscellaneous	708	15
TOTAL	4774	100

CULTURAL ACTIVITIES

a) Planting of Hardwood Cuttings

From January till the end of March the cuttings were made as follows:

	# Cuttings
Poplars	1124000
Willows	745000
TOTAL	1869000

The cuttings were stored from -4°C to +1°C until planting. Planting the cuttings took from May 24 to June 17 (19 days) at the rate of 98368 per day.

FARM OPERATIONS

Chemical Application

Spring chemical application was completed on rowcrops, but seedbeds were by-passed because of early flush and low wet areas. Heavy rains hampered application in mid-season. Overall season was not good for weed control because of high winds, and rain.

Linuron (Lorox) was applied at 2.24 kg (a.i.)/ha in spring for weed control on spruce before flush and in fall when dormant. Applied also on mature caragana before flush. Linuron was applied after transplanting of spruce and after cuttings planted where the stock was dormant.

Chloroxuron (Tenoron) was applied at 6.9 kg (a.i.)/ha in spring on cuttings right after planting. It was also applied to caragana before glush and right after caragana seeding.

Glyphosate (Roundup) was applied at 4.8 kg (a.i.)/ha, used to control thistles and quackgrass.

Gramoxone (Paraquat) applied at 4.8 kg (a.i.)/ha, used to control weeds along fence lines, irrigation lines, roads and around buildings.

Malathion applied at 28 grams/4.546 L of water to control aphids in greenhouses and mosquitoes along creek and fields.

Ferbam applied at .68 kg/4.546 L of water to control cedar rust in junipers.

Esso 350 applied at 450 L (a.i.)/ha to control weeds 3" in height.

Basamid applied at 600 kg (a.i.)/ha to control seedbed germination on fallow areas for seedbed seeding.

Kerb applied at 1 kg (a.i.)/ha to control grasses in stools.

Casoron applied at 168 kg/ha in deciduous shelterbelts four years old and up to control weeds.

Amitrol applied at 5 kg/ha to control thistles.

Meta-Systox-R applied at 2 ml/L to control cooley aphid on douglas fir.

Copper Sulphate applied 50/50 solution in stumps to control suckering.

Diamethoate mixed at 14.21 ml/hole used as drench in golden willow to control wood borers.

Sevin XLR applied at .22 kg/ha to control caterpillars.

Methoxychlor applied at .37 kg/ha to control mosquitoes.

Skoot applied at 50/50 solution for rabbit control in fruit orchard.

Foligard applied at one part to five parts water on container stock.

Fertilizer Applications

1205 kg of 46-0-0 applied
2576 kg of 11-48-0 applied
1052 kg of 0-0-60 applied
100 kg of 16-20-0 applied
78 kg of sulphur applied

Oat Seeding

Seeded 1561 kg of oats as green manure crop. Oats are cut back in mid-season. This causes regrowth which is moved back again in the fall, then ploughed under.

Grass Seeding

Grass was seeded in non-productive areas to help control weeds at 66.5 kg/ha.

Caragana Seeding

Caragana seeding was seeded at 90 seeds/meter in field 30.

New Equipment Received

1 International Irrigation Pump Model
1 Tire Machine
1 Weed Eater
4 Barred Pumps
1 Power Unit
1 Ford Tractor F-1700
1 Blade 702
1 Trencher 725
1 Nider Drill Press
1 Forbro-Under Cutter 1 Weed Badger
2 Ran 50M Bobcat Mowers
2 Hustler Mower 295
1 Meg Welder (Aluminum) AKWC III
1 Case Tractor 1390
1 Howard Rotovator E4-60
1 Howard Rotovator J40
1 Flymo C191684
1 Jacobson 92908
2 Rainbird Water Guns

Equipment Maintenance

The maintenance program involves approximately 20 vehicles, 26 large and small tractors, with also well over one hundred miscellaneous pieces of equipment.

Irrigation

Approximate water total applied was 43,277,532 L. Pump station at Moran's Lake had some vandal problems. Overall irrigation went very well. The reservoir was almost pumped dry on site on one occasion. During very hot weather, crew worked split shifts to keep stock watered.

Beaver Damage

There were four beavers removed this season, overall damage from the beavers was minimal.

Tree Vandalism

One scots pine was lost during the Christmas season. No arrests were made. Cold weather could have made the difference this year.

CHEMICAL STORAGE BUILDING

The Chemical Storage Building was completed in the late fall of 1982 and was manned and operational January 4, 1983. The 760m^2 metal facility is divided into five specific areas:

1. General Storage
2. Fertilizer Storage
3. Soil and Plant Storage
4. Chemical Storage
5. Vertebrate Pest Storage

The building is equipped with a sophisticated safety system.

a) Fire alarm system that can be activated by:
   1. pull stations
   2. heat detector
   3. CO_2 fire suppression system

   and is tied to the Alberta Hospital Fire Department

b) Vapour detection system that sets off an alarm if a high concentration of vapour occurs in:
   1. Chemcial Storage or
   2. Vertebrate Pest Storage

c) A system that annunciates a number of alarm systems in the building:
   1. emergency eyewash
   2. emergency shower
   3. vapours present
   4. high-level exhaust fan in vertebrate pest room
   5. exhaust fan in chemical storage

d) An emergency lighting in the event of power failure

The chemical, fertilizer and vertebrate pest are equipped with explosion-proof roof mounted heating units rather than the conventional open-flame gas fired heaters. These automatically shut-down in the event of a fire. Sewage is collected in two underground tanks. Disposal from the chemical and vertebrate pest empties into a large fibreflass tank and human waste into a smaller holding unit.

Storage is attained by stacking pallet boxes with the aid of a forklift, supplemented by a minimal amount of shelving to accommodate small and/or difficult to palletize items.

Many building deficiencies badgered us for the first half year of operation, however, although not 100%, we are not encountering faults as frequently.

The 263 m^2 General area houses 166 pallet boxes of roottrainers, pots, mesh, twine, seed, forestry boxes as well as burlap rolls and plastics. In the 94.8 m^2 Fertilizer area, 16,677 kg. of fertilizer is stored in 22 pallet boxes, and the 94 m^2 Chemical area has 89 different pesticides, insecticides and miscellaneous stored in 32 pallet boxes and in shelves.

Current renovation in the General area will accommodate receipt of shipments on a flat pallet (skid).

TEMPERATURE IN °C

MONTH	MEAN MAXIMUM	MEAN MINIMUM	MEAN	EXTREME HIGH	EXTREME LOW	PRECIPITATION (mm) RAINFALL	SNOWFALL	TOTAL
January	- 5.2 (- 9.2)*	-15.0 (-20.3)	-10.1 (-14.8)	4.0 (9.5)	-31.0 (-47.0)	- (0.4)	2.6 (24.4)	2.6 (24.8)
February	- 3.5 (- 6.5)	-12.4 (-17.3)	- 8.0 (-11.9)	7.5 (10.6)	-22.0 (-42.0)	tr (0.6)	9.0 (19.0)	9.0 (19.6)
March	0.6 (0.4)	- 8.4 (-10.0)	- 3.9 (- 4.8)	7.5 (13.5)	-17.0 (-32.2)	0.4 (1.0)	16.6 (16.5)	17.0 (17.5)
April	12.1 (11.7)	- 0.7 (- 1.8)	5.7 (5.0)	22.5 (31.1)	-12.0 (-28.3)	10.6 (11.1)	tr (10.7)	10.6 (21.8)
May	17.4 (17.5)	3.7 (4.1)	10.6 (10.8)	29.5 (29.5)	- 4.0 (- 4.0)	10.4 (44.8)	- (0.5)	10.4 (45.3)
June	20.1 (21.5)	8.2 (7.9)	14.2 (14.7)	26.5 (32.2)	0.5 (0.0)	183.4 (93.3)	- -	183.4 (93.3)
July	22.6 (23.4)	12.2 (10.9)	17.4 (17.2)	30.5 (32.2)	9.0 (3.9)	92.5 (97.4)	- -	92.5 (97.4)
August	24.9 (21.7)	10.5 (9.0)	17.7 (16.4)	32.0 (32.5)	1.5 (- 0.6)	10.6 (70.5)	- -	10.6 (70.5)
September	14.4 (17.3)	3.4 (5.1)	8.9 (11.2)	24.5 (33.0)	- 6.5 (- 9.4)	45.4 (41.3)	- (0.7)	45.4 (42.0)
October	11.6 (11.9)	- 0.1 (- 0.4)	5.6 (5.8)	18.0 (27.5)	- 4.0 (-12.0)	17.4 (12.0)	0.6 (2.5)	18.0 (14.5)
November	- 0.3 (1.1)	- 5.8 (- 8.3)	- 3.1 (- 3.6)	12.0 (19.4)	-17.0 (-30.6)	1.0 (1.3)	8.4 (12.4)	9.4 (13.7)
December	-14.1 (- 6.7)	-23.7 (-17.0)	-18.9 (-11.9)	2.0 (11.1)	-38.5 (-43.3)	- (0.5)	17.0 (28.0)	17.0 (28.5)

* 10 year average, 1974 to 1983

TRIAL REPORT SUMMARIES

If you are intested in any of these studies ask for the 1983 report of the 1983 trial series.

INVESTIGATION #28B-83

CONTAINER STOCK MEDIA TRIAL

The purpose of this three year project was to further evaluate media mixes and their adaptability for native stock.

PROCEDURE: The following three deciduous and three coniferous species were planted into two gallon pots (in April of 1983, three replica's of each species + the control).

A. Deciduous:
   Cornus stolonifera (Dogwood - DOG)
   Populus tremuloides (Trembling Aspen - ASP)
   Betula papyrifera (White Birch - WHI)

B. Coniferous:
   Pinus banksiana (Jack Pine - JAC)
   Picea glauca (White Spruce - SPR)
   Larix sibirica (Siberian Larch - SIB)

Peat, sand and vermiculite were used as the control media in a 2-1-1 ratio for (A) deciduous stock and 1-1-1 for (B) coniferous with eight various media mixes and the control.

DISCUSSION OF RESULTS: Since only one growing season is involved the growth results (height increments) are quite inconclusive. The damage on the trembling aspen makes the results of this year's growth unfit for further interpretation.

For the species white spruce and jack pine any of the soil amendments appear to be ineffective. This can be a result of transplanting shock as the root system has to establish again before new growth will develop.

The siberian larch and dogwood species show a marked superior growth for the enriched soil, however, not one particular mixture can be singled out as being superior. In the care of white birch, mixture A8 (where KNO_3 is used instead of K_2SO_4) appears to be the most effective for growth stimulation.

This trial will continue for another two years.

INVESTIGATION #42-83 PROGRAM REPORT

OVERWINTERING OF LARGE CONTAINER STOCK

PURPOSE OF TRIAL: To determine the most successful overwintering condition of a variety of woody plants, growing in two gallon containers. This trial was initiate during the fall of 1982. The overall test period will cover three growing seasons.

DISCUSSION OF RESULTS: Survival rate after the first overwintering indicates the following:

1. Highest survival was obtained by placing the pots upright, and filling in the spaces between the pots with cones (most superior) or peat moss (second best storage method).
2. The lowest survival was obtained by leaving the pots in the lathhouse, standing on top of the elevated metal base.
3. The use of poly and thermoblankets was alomost as beneficial as mulching the pots with cones and peat moss. No protection given to the pots and placing them on the solid ground was a superior storage condition than in the lathhouse.
4. The best surviving species was white spruce, followed by jack pine and siberian larch. The poorest surviving species was saskatoon. (All storage conditions taken into account.)

INVESTIGATION #41-83 PROGRAM REPORT

CONTAINER VS. BAREROOT PLANTS

OBJECTIVE: This field experiment was established in 1982 as a joint research trial by the Alberta Tree Nursery and Horticulture Centre and the Alberta Horticulture Reseach Center in order to study the growing differences, if any, between stock raised in a container and a barerooted woody plant.

INTERPRETATION OF OBSERVATIONS:

1. The growth increase during the second year is considerably larger than in the first year after planting. This applies in particular to the height increment of the Northwest Poplar.

2. The height increase of containerized stock origin is considerably greater for White Spruce and Northwest Poplar, this trend was already established during the first growing year and continued.

3. However, the height increase of Green Ash, Silver Buffaloberry, and Honeysuckle is greater for planting stock originating from barerooted stock (after two years of growth).

This trial will continue to be monitored for another three growing seasons.

INVESTIGATION #39-83 PROGRESS REPORT

OBJECTIVES: To evaluate herbicides, either pre or post emergence effective, and either tropical application or soil incorporated prior to planting. The crops treated were deciduous species, seeded after the seed was stratified. Seedling germination and frequency of weed emergence is being monitored.

1. Only 10 deciduous species are involved; Siberian Crabapple was dropped. These species are now:

1. Prunus tomentosa (Nanking Cherry)
2. Prunus virginiana melanocarpa (Chokecherry)
3. Prunus japonica (Chinese Bush Cherry)
4. Prunus besseyi (Western Sandcherry)
5. Prunus padus commutata (Mayday)
6. Prunus fruticosa (Mongolian Cherry)
7. Quercus macraocarpa (Bur Oak)
8. Ribes albol (Albol Currant)
9. Sheperdia argentea (Buffaloberry)
10. Elaeagnus angustifolia (Russian Olive)

2. The herbicides used are as indicated below:

PLOT NO.		TYPE OF APPLICATION	TRADE NAME	RATE (KG ai/ha)
1.	Linuron	Pre*	Afolan F	1.7
2.	Ethalfluralin	Ppi**	Solanlan 3EC	1
3.	Oryzalin	Pre	Surflan 75 WP	1
4.	Chloroxuron	Pre	Tenoran 50 WP	4
5.	Trifluralin	Ppi	Treflan 4EC	1
6.	Trifluralin	Ppi	Treflan 4EC	2
7.	Napropamide	Pre	Devrinol 50 W	2
8.	Napropamide	Pre	Devrinol 50 W	4
9.	Oxyfluorfen	Pre	Goal	0.8
10.	Oxyfluorfen	Pre	Goal	1.6
11.	Weedy Check			
12.	Handweeded Check			

NOTE: Pre* - Preemergent
Ppi** - Preplant Incorporated

As in the 1981 trial the herbicide treatments were repeated four times. Instead of 12 seeds per species and plot unit, now 25 seeds per species and plot unit were used.

OBSERVATIONS:

A) The second year observations from Field 8a.

1. Seedling Emergence: In most species there is a small reduction in the number of established seedlings, except for Buffaloberry and Russian Olive. These two species show a marked decline in seedlings. Since the drop in seedlings for Buffaloberry and Russain Olive also occur on the non treated

plots, the original herbicide treatment does not appear to be the cause. There does not appear to be evidence that any of the applied chemicals has effected the germination and/or subsequent survival of the seeded species.

2. Weed Growth in the Second Year: Compared with the recordings of 1982, the following weeds disappeared: stinkweed, portulaca, and wild buck weed. While at the same time three new weeds were established: dandelion, tumble weed and Canada thistle.

From comparisons it is evident that in the second year the total number of weedseed germinants is greatly reduced on the chemically treated plots.

B) The first year observations from Field 28.

1. Seedling Emergence: All plants which germinated appeared healthy and had normal growth.

It does not appear that the application of herbicides has affected the germination or survival of seedlings.

2. Weed Control: In the June tally, stinkweed is the most common weed species while in the September recording groundsel is the most numerous weed. The best weed control appears to be accomplished with Chloroxuron. Trifluralin and Napropamide also appear to suppress the weed populations but to a lesser degree. The other applied chemicals appear to be ineffective for weed control.

SEED INVESTIGATION

TRIAL #48 - DORMANCY BREAKING OF HAWTHORN SEED

The production of hawthorn seedlings (2-0) has in the past often been hampered by poor results of germination. Seed dormancy is suspected to be the major cause of the crop failure. This trial systematically investigates steps of seed treatments in order to break dormancy.

RESULTS: The x-ray test showed tht 50% of the seedlot was viable.

CONCLUSION:

1. Acid treatments, as applied appear detrimental to promote germination.
2. Treatment with gibberellic acid, although not detrimental does not seem to effect germination favourably either in the short term or after a lengthy stratification period.
3. Straight stratification periods, either by keeping the seeds in peat moss or moist in a plastic bag, appears to be the best method to promote stratification. It is recommended to stratify hawthorn seeds between 4-5 months in peat moss at 2°-4°C to obtain maximum germination.

SEED INVESTIGATION

TRIAL #47 - INTERIM REPORT

PURPOSE: The purpose of this trial is to determine the optimum rate of seeding in order to achieve the optimum stocking density of seedlings. Since the stocking in mature 2-0 seedbeds varies greatly and since most attained stockings are well below the ideal number of 125, this trial is an attempt to determine more closely the required rate of seeding in order to produce ideally stocked seedbeds.

METHOD: 12 commonly grown 2-0 crops were seeded in the spring of 1983 under normal field conditions. The number of seeds per meter of seedbed used were 500, 1000, 1500, 2000, hand seeded. The number of established germinants were counted at the end of the 1983 growing season. Every seeding per variety was repeated three times and the replica's were randomized through the seedbed area.

Count of the number of acceptable plants after the first growing season is recorded (average of three counts).

A new seeding of this trial was repeated in the fall of 1983 and one more seeding is planned for the fall of 1984. The seedlings will be monitored for a two year period (the final count of seedlings will apply to mature 2-0 stock).

SEED LABORATORY

During 1983 the seed laboratory staff's main efforts were concentrated on three major programs:

a) Seed Center
b) Seed Orchards
c) Seed Investigations

A) SEED CENTER

The fruit and cones of 40 species of deciduous and coniferous trees and shrubs were harvested on and off the nursery to satisfy the increased field and container seeding program.

The processed seed was cleaned and stored to ensure an adequate supply of high quality seed in the potential for prairie planting.

The 1983 seed crop was very good, very generous but due to dry spring conditions the seed viability was substantially lower than in past years.

The 1983 annual seed collection and the ten years (1973-1983) summary seed collection are recorded in the following tables I and II.

1983 ANNUAL SEED COLLECTION, Table I

COLLECTED SPECIES	DATE OF HARVEST	AMOUNT OF FRUIT/CONES PICKED (kg)	YIELD OF CLEAN SEED (kg)
Tall Deciduous	1.6 - 20.10.83	253	142
Small Deciduous	19.7 - 11.10.83	1,087	157
Hedge Plants	18.7 - 13.10.83	2,768	220
Coniferous Trees	15.8 - 27.10.83	1,422	18
TOTAL		5,530	537

SEED COLLECTION SUMMARY: 1973 - 1983, Table II

YEAR	AMOUNT OF COLLECTED FRUIT/CONES kg		YIELD OF CLEAN SEED kg	
	DECIDUOUS	CONIFEROUS	DECIDUOUS	CONIFEROUS
1973	474	103	54.14	1.40
1974	2005	1635	22.39	37.60
1975	682	1808	55.40	49.50
1976	662	131	188.38	23.98
1977	868	98	203.92	12.78
1978	995	193	257.33	63.50
1979	718	4091	102.66	69.51
1980	1573	212	358.00	9.00
1981	1594	1835	518.64	9.80
1982	1596	5145	175.00	55.00
1983	4108	1422	519.00	18.00

47 - '83, Seeding Density Trial

The purpose of this trial is to determine the optimum seeding rate and population density for deciduous stock field grown at the Alberta Tree Nursery and Horticulture Centre.

12 species were seeded for four different seed rates (A-500, B-1000, C-1500, D-2000 seeds/m) with three replicates.

Seeding times: Spring '83
Fall '83
Fall '84

Count of the number of acceptable plants after the first growing season is recorded in the following table (average of three replicas).

SPECIES	NUMBER OF SEED PER METER OF SEEDBED VERSUS NUMBER OF ACCEPTABLE PLANTS 500	1000	1500	2000
Villosa Lilac	250	427	650	600
Common Lilac	114	120	246	242
Honeysuckle	149	153	188	290
Hedge Rose	3	4	22	2.3
Altaica Rose	0	0.6	0	0.6
Silver Buffaloberry	58	206	228	.88
Cherry Prinsepia	110	55	158	158
Dogwood	274	659	1146	1016
Mayday	30	161	354	186
Chokecherry	0	1.6	10	9
Russian Olive	70	79	133	95
Sea Buckthorn	138	157	295	116

This trial was reseeded in the fall of '83 and observations will continue.

48 - '83, Dormancy Breaking of Hawthorn Seeds

The production of hawthorn seedlings (2-0) has in the past often been hampered by poor results of germination. Seed dormancy is suspected to be the major cause of the crop failure. This trial systematically investigates steps of seed treatments in order to break dormancy.

Method: 300 grams of fleshy hawthorn (around 10,000 seeds) was split up in three equal parts to be used in three treatments, as follows:

1. Acid Treatment: Seedlot divided into three equal parts
   Lot one, soak seed in H_2SO_4 for 10 minutes
   Lot two, soak seed in H_2SO_4 for 20 minutes
   Lot three, soak seed in H_2SO_4 for 30 minutes

After acid treatment wash lot for 10 minutes in running water. Stratify each lot, wet, in a platic bag for four to eight weeks at 1°- 4°C.

2. Gibberellic Acid: A saturated solution of gibberellic acid is diluted to two concentrations - 30% and 60%.

Soak ½ of lot for 48 hours in each concentration.

Take each treated lot and stratify wet, at 2° - 4°C.

After stratifying one month, two months, three months, the germination % as under Acid Treatment is determined.

3. Straight Stratification: Soak seed in water for three days.

Put ½ of lot in moist peat and ½ lot wet in plastic bag.

After two months determine germination % every four weeks for 3 x 4 weeks. (Use same method as under Acid Treatment).

The seedlot as a whole was x-rayed.

Results: The x-ray test showed that 50% of the seedlot was viable.

The three treatments and their refinements gave the following results:

TREATMENT	GERMINATION %
1. Acid Treatment	
H_2SO_4 10 minute + 1 month stratification	3.3%
H_2SO_4 10 minute + 2 months stratification	0%
H_2SO_4 30 minute + 1 month stratification	3.3%
H_2SO_4 30 minute + 2 months stratification	0%
H_2SO_4 50 minute + 1 month stratification	2.0%
H_2SO_4 50 minute + 2 months stratification	0%
2. Gibberellic Acid Treatment	
GA solution 30% + 1 month stratification	0%
GA solution 30% + 2 months stratification	12.0%
GA solution 30% + 3 months stratification	17.3%
GA solution 60% + 1 month stratification	0.7%
GA solution 60% + 2 months stratification	10.0%
GA solution 60% + 3 months stratification	29.3%
3. Straight Stratification	
Wet in plastic bag stratification 2 months	9.3%
Wet in plastic bag stratification 3 months	33.3%
Wet in plastic bag stratification 4 months	18.6%
Wet in plastic bag stratification 5 months	17.0%
Peat moss stratification 2 months	16.6%
Peat moss stratification 3 months	6.6%
Peat moss stratification 4 months	42.7%
Peat moss stratification 5 months	35.6%

Conclusions:

1. Acid Treatments, as applied appear to detrimentally affect germination.
2. Treatment with gibberllic acid, although not detrimental does not seem to effect germination favourably either in the short term or after a lengthy stratification period.
3. Straight stratification periods, either by keeping the seeds in peat moss or moist in a plastic bag, appears to be the best method to provide stratification. It is recommended to stratify hawthorn seeds between four to five months in peat moss at 2° to 4°C to obtain maximum germination.

SEED STORAGE ANNUAL INVENTORY - DECEMBER 1983

1.	Shelterbelt Program	1016 kg
2.	Provincial Parks	75 kg
3.	Reclamation Branch	57 kg
4.	Private Companies	372 kg
5.	Miscellaneous	105 kg
	TOTAL	1625 kg

During 1983, the seed testing laboratory prepared over 850 kg of over thirty different types of seed for nursery field and container sowing.

Germination tests were completed on 250 seed lots.

The Seed Center received cones and fruit totalling over 1,124 kg from many private companies for cleaning, testing, and storage.

Throughout the year over 10 kg of seven seed species were sold to commercial nurseries and individual growers.

B) SEED ORCHARDS

Saskatoon Plantation

The observations which include evaluations of growth habits, survival rate, as well as seed harvesting of six saskatoon varieties for the 1983 growing season were carried out. The saskatoon fruit harvesting is included in Table III.

SASKATOON FRUIT HARVESTING, Table III

1.	Smoky Lake	55 kg
2.	Pembina	11 kg
3.	Northline	35 kg
4.	Honeywood	2 kg
5.	Moon Lake	6 kg
6.	Thiessen	6 kg
	TOTAL	115 kg

The means of the 1983 collected data on this trial are included in Table IV.

SURVIVAL AND VISUAL/TASTE RATINGS OF SIX SASKATOON VARIETIES, Table IV
(Means of 24 trial plots on Field #11b)

SASKATOON VARIETY	# PLANTED +	SURVIVAL (%) '79	'80	'81	'82	'83	VISUAL RATING ++ '79	'80	'81	'82	'83	FRUIT TASTE ++ '81	'82	'83
Smoky	20	100	100	100	100	100	7	9	9	9	9	9	9	9
Northline	20	100	100	100	100	90	8	8	9	9	8	7	7	8
Honeywood	20	90	85	90	100	100	6	7	7	8	9	6	5	5
Pembina	20	90	90	90	100	100	6	8	8	9	9	6	6	6
Moon Lake	20	100	100	80	100	90	7	9	7	8	8	7	8	8
Thiessen	20	100	100	80	100	100	8	9	9	7	8	5	5	5

\+ Planted May, 1979
++ Scale: 9 - 0 (9 best)

SEED PRODUCTION ORCHARDS

The seed orchards at the Alberta Tree Nursery & Horticulture Centre now consist of over five hundred trees and shrubs representing coniferous and deciduous species from several different countries.

The contributions of seed from seed production orchards was significantly higher in 1983 than in previous years. This yield consisted of cones and berries respectively picked in quantities of:

270 kg of Bugnet Pine
57 kg of Mongolian Cherry
70 kg of Silver Buffaloberry
9.5 kg of Sandcherry

MCCALLA FRUIT ORCHARD

Throughout the 1983 growing season, we continued to maintain and monitor the condition of fruit trees planted for the purpose of public use as part of a trial of the Alberta Horticulture Research Center Brooks.

The evaluations included the date of flowering, yield, fruit size, diseases and other readings and observations.

In the fall, apples and plums were picked from the trees.

The following varieties yielded fruit:

9 - 22 End	7 apples	Brookland	31 apples
Rosybrook	155 apples	BA - 34	93 apples
Sunnybrook	1 apple	Rescue	100 apples
Patterson	52 apples	BF - 135	6 apples
Collet	54 apples	Miami	149 apples
BF - 111	10 apples	Brookred	6 plums
Heyer 20	8 apples	Bounty	11 plums
PF 36	70 apples	BF - 91	5 plums
Westland	20 apples	Norther	14 plums
Hermansky	79 apples	Pembina	4 plums

TEST ORCHARD REPORT
ALBERTA HORTICULTURE RESEARCH CENTER
Brooks, Alberta

NAME: Alberta Tree Nursery & Horticulture Centre
ADDRESS: R.R. #6, Edmonton, Alberta T5B 4K3

YEAR(S) PLANTED: 1975 - 1983
YEAR OF REPORT: 1983
LAND LOCATION: N.W.S. 5-54-23-4, Zone 3A, Region
DATE OF HARVEST - No. of days after 31st of July
YIELD 1-4 (1=nil, 2=light, 3=medium, 4=heavy)
SIZE: S (small 5-6cm), M (medium 6-7cm), L (large over 7 cm) measured as equator diameter of fruit.

RATINGS:
- WI - Winter Injury 9-0 (0=0%, 9=90%)
- VR - Vigor 1-5 (1=low vigor, 5=very vigorous)
- CL - Chlorosis 1-4 (1=none, 4=severe)
- FB - Fire Blight 0-9 (0=nil, 9=very severe)
- LB - Limb Breakage 1-9 (1=0-10%, 9=81-90%)
- CA - Crotch Angle 1-9 (1=0-10%, 9=81-90%)

CULTIVARS	NO. OF TREES REMAINING	CONDITION OF TREES (RATING)						YEAR OF 1st BEARING	DATE OF HARVEST	YIELD	FRUIT SIZE	YEAR PLANTED
		WI	VR	CL	FB	LB	CA					
9 - 22 End	1	4	2			1	6	1980	37	2	L	75
Sunnybrook	6	4	3	1		1	7	1981	37	2	M	75, 80
Rosybrook	5	1	1			1	6	1981	37	4	S	75, 79, 80, 76
Patterson	2	1	2			1	6	1980	37	3	M	75
Parkland	3	New				1						83
Collet	3	2	2			1	6	1983	37	3	M	75
BF - 177	1	5	4			1	7					75
PF - 51	2	New				1						83
BF - 111	3	5	4			1	4	1981	40	3	M	75
Hibernal	1	6	4			1	5					80
Heyer 20	1	6	4			1	6	1980	37	2	M	75
PF - 36	4	0	1			5	5	1981	37	4	M	79, 83
Pioneer 10	3	4	4			1	6					79
Westland	3	3	3			2	7	1983	40	3	L	75, 80
Hermansky	3	2	4	1		1	4	1982	40	4	M	80
Norland	3	New				1						83
BA - 13	2	3	3	3		1	7					75
PF - 12	1	New				1						83
Brookland	6	0	1		2	5	7	1980	37	3	S	75, 80, 83
BA - 34	3	4	4	2		1	6	1981	37	4	M	79
Lethbridge	1	6	4			1	4					79
Heyer 12	2	New				2						83
Moris	1	1	3	2		1	8					79
BA - 21	2	5	5			1	4					79
Rescue	4	0	1			1	7	1981	37	4	S	75, 83
BF - 135	2	1	1			1	8	1981	37	2	S	75
BF - 9	3	1	1	2		1	7					76
Miami	3	2	3			1	5	1981	37	4	M	79
Kerr	2	New				1						83
Brookred	3	0	1			2		1983	33	2		80
Brookgold	5	0	1			5						75, 80, 83
Korean Plum	3	0	1			1						75, 77
Bounty	4	1	1			1		1981	33	2		75, 80, 83
BF - 91	2	0	1			1		1983	33	2		75
Pembina	3	2	2			1		1983	33	2		75, 83
Norther	3	0	1			1		1980	29	2		75

C) SEED INVESTIGATIONS

During 1983 the following investigations were either started or continued:

CODE	TRIAL DESCRIPTION	CURRENT STATUS
0 - '83	Agrisonic ultra - sound seed treatment	terminated
30 - '83	Cooperative seed testing project	on-going
31 - '83	Propagation of sub-tropical trees and shrubs	terminated
47 - '83	Seeding density trial	on-going
48 - '83	Dormancy breaking of hawthorn seed	terminated

Each of the above listed trials is briefly described as follows:

0 - '83, Agrisonic Ultra - Sound Treatment

This trial was started in 1982. Seeds from lodgepole pine, hawthorn, and wild rose were exposed to the "ultra - sound" treatment. In 1982 only lodgepole pine seeds did germinate. Further observations in 1983 did not change this situation. Since lodgepole pine in practice germinates readily, while rose and hawthorn are seeds which usually give poor germination results if not treated through stratification, it is concluded that ultra - sound treatment does not influence the germination of the three species.

30 - '83, Cooperative Seed Testing Project

The summary findings of this project, on-going since 1982, were published in 1983, under the title "Testing of Seed Germination Treatments for Selected Native Shrub Species", by P. King, G. Grainger, and A. Straka. It is available through Alberta Energy and Natural Resources.

ABSTRACT

The results of preliminary experiments on pre-germination treatment methods for nine selected native woody plant species are presented. The species investigated include Amelanchier alnifolia (saskatoon), Arctostaphylos uva-ursi (bearberry, Elaeagnus commutata (silverberry), Juniperus communis (common juniper), Rosa acicularis (prickly rose), Rosa woodsii (Fendler woods rose), Rubus parviflorus (thimbleberry), Rubus strigosus (wild red raspberry) and Sherpherdia canadensis (russet buffaloberry).

These studies represent a portion of a program to evaluate, select and test native trees and shrubs for disturbed land reclamation in the Rocky Mountain Eastern Slopes of Alberta.

31 - '83, Propagation of Sub-Tropical Trees and Shrubs

The seeds of the tested plants were collected in Argentina (1977), only the following plants are still surviving: Verbena tridens; 5 plants, Pinus Sp.; 9 plants, and Araucaria araucana; 1 plant.

POOR

QUALITY

ORIGINAL